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| | | | | | |
|---------------------|-------------|--------------|---------|-------------|----------------|
| Reserved log. | | | | 68 | |
| Half sum. | 31° 53' 18" | Half cose. o | 13857 | | |
| Half rem. | 19 35 17 | Half cose. o | 23731 | | |
| Ha. diff. of t. al. | 5 42 38 | Sine. | 8 99783 | 8 99783 | |
| | | | | | |
| | 13° 19' &c. | Tangent. | 9 37439 | Cose. o | 63745 |
| | | | | | |
| | | | | 25° 34' 56" | Sin. 9 63528 |
| | | | | 2 | |
| | | | | | |
| | | | | 51 9 52 | True distance. |

Instead of finding the seconds in the arc answering to the above tangent, the corresponding cosecant is found at once by the following proportion : as the difference between the next greater, and next less tangents, to the difference between the corresponding cosecants, so is the difference between the given tangent, and the next greater, to a fourth number, which must be added to the least of the corresponding cosecants.



IV. *Observations of an Annular Eclipse of the Sun, at Cambridge, April 3d, 1791, by SAMUEL WEBBER, A. M. Hollis Professor of Mathematicks and Philosophy in the University at Cambridge.*

EXPECTING an annular eclipse of the sun, on the third of April, I previously took corresponding altitudes of the sun with a transit instrument, in order to ascertain, with all the precision in my power, the going of the clock, which belongs to the University. But, the day before the eclipse happened, the clock unfortunately stopped, for want of some repairs,

repairs, which, it was expected would have been made before that time. This circumstance not only occasioned the loss of the observations that had been made on the going of the clock, but also rendered it wholly unfit to be used in viewing the expected phenomenon, or in making any kind of astronomical observations. The failure of my clock being known to the Reverend President of the University, he, with his usual goodness, invited me to observe with him; as his clock was good, and regulated for the purpose. The telescope which I intended to use on this occasion, was accordingly removed to his house. It is a reflector made by Short, three feet in length, and magnifying 90 times. The time of each contact was noted, and afterwards reduced to apparent time, according to the clock's difference from apparent time, and rate of going, as determined by the President; and is as follows, viz.

| | | | | |
|--|----|----|----|-------|
| Beginning, or first external contact, April 3. | h. | ' | " | |
| | 6 | 1 | 27 | A. M. |
| First internal contact, | 7 | 8 | 7 | |
| Second internal contact, | 7 | 12 | 56 | |
| End, or second external contact, | 8 | 28 | 26 | |
| | | | | |
| | h. | ' | " | |
| Annulus, | 0 | 4 | 49 | |
| Duration, | 2 | 26 | 59 | |

Viewed through a telescope, the eclipse appeared to be nearly, or quite central. At both the internal contacts, there was a curious and striking appearance of what may be called drops, on account of their resemblance to drops of a fluid. At the first contact, when the horns of the sun were forming a ring about the moon, these luminous drops suddenly appeared.

appeared at several different points, with very little difference of time. At first, they were nearly circular ; but they rapidly extended themselves along the limb of the sun, till uniting, they completed the annulus. At the second contact, several breaches in the annulus almost instantaneously succeeded the first, at different distances from each other ; and the oblong drops included between them, contracted and vanished.

The sky was perfectly clear, during the whole time of the eclipse ; and our observation was not interrupted by the intervention of a single cloud.

The fear of losing an observation of one of the contacts prevented my taking any measures with a micrometer ; as the only one in my possession is fitted to the telescope, with which I observed the contacts ; and some time would be requisite to adjust it to the micrometer, and afterwards for use without it.



V. Observations of the Transit of Mercury over the Sun's Disc, November 5th, 1789, by the Rev. JOSEPH WILLARD, D. D. President of the University, and Vice President of the American Academy of Arts and Sciences.

THE circumstances attending the transit of Mercury, which happened November 12th, 1782, were more favourable in North America than in Europe. The altitude of the Sun was much greater at the beginning of the transit, and the whole was visible to us ; whereas the Sun sat in
Europe,